

Anti-Epileptic Drug (AED) Substitution Guidance Document for Patients Unable to Take Oral Medications

1. Substitutions are based on mechanism of action and/or effectiveness for seizure/epilepsy type.
2. Substitute with parenteral/intravenous (IV) formulation if available (non-formulary IV formulations denoted by asterisk*).
3. For AEDs without suitable IV substitutions, consider feeding tube placement. May also consider orally disintegrating (ODT) tablets, if available.
4. If a patient is on 4 AEDs and one of these has no suitable alternative, consider holding this single AED without replacement if clinically appropriate.
5. If there is no suggested substitute, consider any of the IV AEDs listed in Chart A as appropriate for seizure/epilepsy type.
6. Parenteral ketogenic diet is possible for hospitalized patients. Contact nutrition support if IV ketogenic diet is desired.

Generic (Brand) Abbrev.	Parenteral Available	Substitution/s	IV Alternative Conversion	Comments
Brivaracetam (Briviact®) BRV	*YES	LEV	1:10 BVT:LEV	BRV (PO and IV) non-formulary
Cannabidiol (Epidiolex®) CBD	NO	None - see Chart A	N/A	
CarBAMazepine (Tegretol®) CBZ	*YES	LCM or FOS	N/A	CBZ (IV) non-formulary
CloBAZam (Onfi®) CLB	NO	LZP	10:1 CLB:LZP	CLB (ODT) non-formulary; oral liquid restricted to pediatrics
Clonazepam (Klonopin®) CZP	NO	LZP	1:4 CZP:LZP	Consider CZP ODT
Clorazepate (Tranxene®) CLZ	NO	LZP	7.5:1 CLZ:LZP	
Corticotropin (Acthar®) ACTH	N/A	IV methylpred.	See comments	Discuss IV methylpred. dosing with pediatric epilepsy staff
Diazepam (Valium®) DZP	YES	N/A	1:1 PO DZP:IV DZP	Consider maximum 5 mg IV per dose for pediatric patients
Eslicarbazepine (Aptiom®) ESL	NO	LCM or FOS	N/A	
Ethosuximide (Zarontin®) ESM	NO	VPA	N/A	
Felbamate (Felbatol®) FBM	NO	LCM or FOS	N/A	
Gabapentin (Neurontin®) GBP	NO	None - see Chart A	N/A	
Lacosamide (Vimpat®) LCM	YES	N/A	1:1 PO LCM:IV LCM	
Lamotrigine (Lamictal®) LTG	NO	LCM or FOS	N/A	Consider LTG ODT
Levetiracetam (Keppra®) LEV	YES	N/A	1:1 PO LEV:IV LEV	
Lorazepam (Ativan®) LZP	YES	N/A	1:1 PO LZP:IV LZP	
Oxcarbazepine (Trileptal®) OXC	NO	LCM or FOS	N/A	
Perampanel (Fycompa®) PER	NO	None - see Chart A	N/A	IV formulation under FDA review, expected 2021
Phenobarbital (Luminal) PB	YES	N/A	1:1 PO PB:IV PB	
Phenytoin (Dilantin®) PHT	YES	Fosphenytoin	1:1 PO PHT:IV FOS	Phenytoin (IV) is non-formulary
Pregabalin (Lyrica®) PGB	NO	None - see Chart A	N/A	
Primidone (Mysoline®) PRM	NO	PB	5:1 PO PRM:PO PB	
Rufinamide (Banzel®) RUF	NO	LCM or FOS	N/A	
Topiramate (Topamax®) TPM	NO	None - see Chart A	N/A	
Valproic acid (Depakote®) VPA	YES	N/A	1:1 PO VPA:IV VPA	Administer same total daily dose divided q8h
Vigabatrin (Sabril®) VGB	NO	None - see Chart A	N/A	
Zonisamide (Zonegran®) ZNS	NO	None - see Chart A	N/A	

Chart A: Dosing Recommendations for IV AEDs

A loading dose is not necessary in all cases, but may be considered in patients with frequent seizures, or as otherwise clinically indicated. Due to the time required to reach steady-state and/or the large volume of distribution, a full or partial loading dose may be favored for FOS, PB, and VPA. A full or partial loading dose may also be favored when replacing an enteral AED with a short half-life/duration of action (e.g., BRV, CBD, GBP, OXC, VGB).

AED	Pediatric Dosing			Adult Dosing		
	[§] Load (IV once)	Max. Load	Maintenance	[§] Load (IV once)	Max. Load	Maintenance
[†] FOS	15-20 mg PE/kg	1500 mg PE	5-6 mg PE/kg/day (divided q12h)	10-20 mg PE/kg	2000 mg PE	4-6 mg PE/kg/day (divided q12h)
LCM	5-10 mg/kg	400 mg	1-5 mg/kg/day (divided q12h)	200-400 mg	600 mg	200-600 mg/day (divided q12h)
LEV	40 mg/kg	2000 mg	40 mg/kg/day (divided q12h)	1000-3000 mg	3000 mg	1000-4000 mg/day (divided q12h)
LZP	Not needed	Not needed	0.05 mg/kg dose, (max 2 mg), q 8H	Not needed	Not needed	2 mg q8h
[‡] VPA	20 mg/kg	2000 mg	20-30 mg/kg/day (divided q8h)	10-40 mg/kg	3000 mg	10-60 mg/kg/day (divided q8h)
PB	10-20 mg/kg	1000 mg	2.5-5 mg/kg/day (divided q12h)	5-20 mg/kg	2000 mg	90-300 mg/day (divided q8h)

[†]Fosphenytoin (Cerebryx®) (FOS); [‡]Consider avoidance of VPA peri-operatively due to concern for inhibition of platelet aggregation; [§]Consider loading dose at higher end of listed range only in the setting of active seizures/status epilepticus (please note that loading doses of PB may cause significant respiratory depression);